



Infrastructure, buildings, environment, communications

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ENVIRONMENTAL

Subject:

Phased Remedy Approach Proposal, North Bronson Industrial Area Site, Operable Unit 1, Bronson, Michigan.

Dear Ms. Nguyen:

On behalf of the North Bronson Potentially Responsible Parties (PRP) Group, ARCADIS has prepared this Phased Remedy Approach (PRA) Proposal for the North Bronson Industrial Area (NBIA), Operable Unit 1 (OU1) (United States Environmental Protection Agency [USEPA] Facility Identification Number MID005480900) located in Bronson, Michigan (Site).

This PRA Proposal was prepared to further address the requirements outlined in the Consent Decree filed in the United States District Court for the Western District of Michigan, Southern Division, United States of America vs. Bronson Plating Company, et al., entered on February 29, 2000.

Objective

This PRA Proposal was developed based on the results of the meeting on December 19, 2002 between representatives of the North Bronson PRP Group, the USEPA, the Michigan Department of Environmental Quality (MDEQ), and ARCADIS. The purpose of the meeting was to discuss the results of recent field efforts that were presented in the Draft Phase II Pre-Design Studies Technical Memorandum (ARCADIS December 4, 2002), including the following:

- 1) The shallow aquifer in the Western Lagoon Area (WLA) is thicker than originally thought when the Record of Decision (ROD) was written;
- 2) The greater aquifer thickness may limit the applicability of the engineered wetland for groundwater treatment because of the increased volume of groundwater that may be produced; and

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Part of a bigger picture

- 3) The greater aquifer thickness also may limit the ability of a French drain to capture groundwater from the entire vertical profile of the shallow aquifer if, indeed, such extensive hydraulic control is necessary to comply with the ROD requirement to protect County Drain No. 30 (CD-30) from adverse effects originating from the Western Lagoons (WLs)¹.

After discussing the items listed above, it was apparent that the OUI ROD groundwater remedy (i.e., the French drain to protect CD-30 and engineered wetland system for extracted groundwater treatment) might not be appropriate based on the present understanding of site hydrogeology. The PRP Group recommended further evaluation of the hydraulic interaction between the upper aquifer and CD-30 in conjunction with the collection of regional groundwater quality data from the North Bronson Former Facility Sites (NBFFS) to assess the requirements and/or necessity for a groundwater remedy at OUI and evaluate whether combining the effort with Operable Unit 4 (OU4) would be more efficient and cost-effective.

Because both the PRP Group and the USEPA are interested in proceeding with remediation as quickly as possible, the PRP Group proposes to implement the Remedial Design/Remedial Action for the OUI ROD remedy in two separate phases: an initial consolidation phase and a deferred groundwater remedy phase.

- The initial consolidation phase would involve the excavation and consolidation of the Eastern Lagoon Area (ELA) sludges/soils and CD-30 sediments into the WLs. Because the consolidation into the WLs would occur without the French drain to protect CD-30, the initial Remedial Design/Remedial Action will include design provisions to minimize potential adverse impacts to groundwater following consolidation into the WLs and, if necessary, implementation of groundwater contingency measure(s) to prevent exacerbation of discharge to CD-30. The

¹ The ROD discusses treatment of groundwater from the WLs, not from the WLA. Therefore, WL will be used throughout this document. (See ROD, page 28, #4 - "Also, contaminated groundwater emanating from the lagoon areas would be intercepted by a French Drain and treated before it could enter CD-30 and recontaminate that portion of the county drain." Page 32 "...the treatment wetland appears to be a technically feasible but untested option to address the lagoon contaminated groundwater at the site." ROD, page 39, 10.C. "A French Drain will be installed along the WL area to intercept contaminated groundwater from the WLs." "Groundwater impacted by the waste material in the WL repository will be intercepted by a French Drain to prevent it from entering CD-30.")

results of post-consolidation groundwater-elevation and -quality monitoring will be used to determine whether contingency measures are necessary and/or if a groundwater remedy is required at OU1 to protect CD-30 from impacts emanating from the WLs.

- The groundwater remedy phase for OU1 would be deferred until sufficient post-consolidation groundwater-quality data are collected and evaluated. If an OU1 groundwater remedy is required to protect CD-30, the PRP Group will develop an appropriate design consistent with the ROD requirements based on post-consolidation groundwater-quality data. The results of the regional groundwater monitoring at OU1 and the NBFFS data collected during this time will also be used to evaluate the regional groundwater remedy requirements at OU4 and determine if the OU1/OU4 groundwater remedies should be combined.

Phased implementation of the OU1 remedy would allow the consolidation of the ELA and CD-30 materials to proceed in an expedited manner, while additional regional groundwater-quality data are collected both in OU1 (in conjunction with the remedial design) and at the NBFFS. Deferring the design and implementation of the OU1 groundwater remedy will focus and simplify the design of the consolidation phase of the remedy, which should allow implementation in mid-year 2004. In addition, developing the OU1 groundwater remedy after actual post-consolidation groundwater-quality data are available will reduce the uncertainty in the performance requirements, resulting in a streamlined remedy selection and design process. Finally, deferring the implementation of the OU1 groundwater remedy may allow implementation of an integrated OU1/OU4 remedy that would be more efficient and cost-effective than addressing the two issues separately.

This document outlines the proposed phased implementation of the consolidation of the soils and sludges from the ELA and CD-30 to the WLs. This initial phase of the remedy for OU1 is presented below as a three-step process that includes 1) Remedial Design, 2) Remedial Action, and 3) Contingency Groundwater Measure(s). The proposed submittals and schedule for this work are discussed at the end of this letter.

Remedial Design Phase

The Remedial Design includes four initial components of additional data collection and/or analysis: sludge/sediment characterization, hydraulic assessment, pre-consolidation baseline groundwater sampling, and contingency groundwater measures response (CGWMR) criteria development to evaluate impacts to groundwater quality from the WLs and potential exacerbation of discharge to CD-30.

The details of each component are outlined below and will be further developed in a Sludge/Sediment Characterization & Baseline Sampling Work Plan and the Remedial Design Work Plan. Data evaluation and the development of design documents will be completed in conjunction with these initial components.

Sludge/Sediment Characterization

Prior to submitting the 30 Percent (Preliminary) Design, the PRP Group will conduct additional studies to further characterize the physical and chemical properties of the sludge in the ELA, as well as the sediments in the WLs and CD-30. Completion of these studies will reduce the uncertainty regarding the potential for pore-water release and leaching after consolidation and facilitate the selection of appropriate design provisions.

Sludge and sediment samples will be collected and submitted to a geotechnical testing laboratory to determine physical characteristics. Representative pore-water samples will be submitted to a chemical testing laboratory and analyzed to estimate the concentrations of constituents of concern (COCs) that may be released during excavation, initial consolidation, and/or long-term leaching generated from the limited percolation of rainwater through the WL engineered cover.

Hydraulic Assessment

Data from the Phase II Pre-Design Studies investigation (ongoing quarterly synoptic water-level measurements and proposed hydraulic assessment) will be used to assess the variability of groundwater-flow conditions in OUI and evaluate the degree of interaction between the upper aquifer and CD-30. Characterization of groundwater flow and hydraulic communication between the upper aquifer and CD-30 are prerequisites to understanding the potential for contaminant transport from the lagoons (post-consolidation) to CD-30 and then designing the final compliance-monitoring network. The results of the hydraulic assessment will also provide information about the degree of hydraulic communication between the WLs and the upper aquifer. This information can be used to develop design criteria for material placement in the lagoons, including the evaluation of any potential dewatering requirements during consolidation.

Groundwater Monitoring

The limited number of historical groundwater samples from the OUI monitoring network and upgradient Remedial Investigation wells may make it difficult to discern

normal seasonal variability and/or COC migration associated with upgradient sources from post-consolidation leaching in the WLs. Therefore, two additional rounds of groundwater sampling are recommended at select wells within OUI prior to completing the 30 Percent Design Report. The proposed sampling rounds will provide additional data to evaluate the COC concentration trends over the past few years and assist with developing a more accurate assessment of baseline conditions.

Contingency Groundwater Measures Response Criteria

The objective of the contingency groundwater measures is to minimize or prevent potential exacerbation of groundwater quality discharging from the WLs to CD-30. The PRP Group recommends that the decision to implement contingency groundwater measures be based on interstitial monitoring, hydraulic communication with CD-30, and post-consolidation groundwater-quality monitoring. The PRP Group will develop CGWMR criteria during the 30 Percent Design for each of the COCs and apply the criteria to individual wells in the WLA.

The decision to implement a contingency groundwater measure would be evaluated with the USEPA, considering the potential for increased discharge from the WLs to impact CD-30 based on the location of the affected well(s) and the magnitude and duration of the constituent concentration increase.

Hydraulic measurements and sampling will be performed during and after consolidation to monitor for potential pore-water release and COC concentrations within the impoundments (e.g., using interstitial wells and/or lysimeters) and for recharge to the upper aquifer (e.g., using WLA monitoring wells and staff gauges). The results will be used to evaluate the duration and significance of potential recharge from the WLs to the upper aquifer and assess whether it would exacerbate the WL discharge to CD-30.

Post-consolidation groundwater sampling results will be compared to the pre-design study and baseline sampling results to determine if the WLs are exacerbating the quality of groundwater discharging to CD-30 following consolidation. In the absence of clear pre-consolidation concentration trends, statistical analyses will be used to compare pre- and post-consolidation groundwater quality to determine whether groundwater quality is adversely affected by consolidation. As performance-monitoring data are collected following consolidation and clear trends appear, statistical trend analysis methods will be applied to evaluate whether consolidation is

causing significant and sustained increases in constituent concentrations from the WLs and if these are impacting CD-30.

Should post-consolidation groundwater quality exceed the CGWMR criteria, confirmatory sampling would be performed to verify results. The results of the confirmatory sampling would be reviewed with the USEPA to determine if contingency groundwater measures would be required. If required, the contingency groundwater measure would be implemented until groundwater quality is below CGWMR criteria.

Remedial Action Phase

The scope of Remedial Action measures will be finalized during the Remedial Design phase, after completing additional groundwater monitoring events and the evaluations of sludge/sediment characteristics and hydraulic interactions between groundwater and the WLs and CD-30.

Removal Action at Eastern Lagoon Area and CD-30

The phased approach will address source material (i.e., sludges and impacted soils and sediments) within the ELA and CD-30 through removal and consolidation as described in the ROD. The removal action will consist of the following:

- Excavate all accessible soil within the limits of the ELA and above the water table (approximately 9,500 cubic yards, in-situ), including berm materials, for transfer and consolidation into the WLs.
- Excavate all practicably accessible sludge material above and below the water table (approximately 2,800 cubic yards, in-situ) for management in like fashion.
- Excavate all accessible and potentially impacted alluvial sediments (approximately 2,100 cubic yards, in-situ) from within a 7,000-foot reach of CD-30 (immediately upstream of the ELA to approximately 2,500 feet downstream of the WLA).

A total of approximately 14,400 cubic yards (in-situ) of material will be removed from the ELA and CD-30 and consolidated into the WLs. This approach will effectively remove more than 82 percent of the known inorganic contaminant mass from the ELA, which is expected to significantly improve groundwater quality in the ELA over time. Supporting estimates of excavation volumes and calculations of predicted mass reductions will be included in the Pre-Design Studies Report.

The means and methods of excavating the sludge, soil, and sediment from the ELA and CD-30 will be determined based on the findings of the sludge/sediment characterization studies.

If the findings indicate that the nature of the sludge or sediment will allow passive dewatering of excavated materials, the pore water will be managed during the excavation and staging process. Conversely, if the sludges will retain pore water that would be released during consolidation, then active ex-situ methods (i.e., mechanical and/or thermal processes) may be employed to minimize pore-water release during consolidation. If the potential for significant long-term leaching is indicated, provisions will be made in the Remedial Design to address this issue.

The excavation will be accomplished using one or more of the following methods:

- Excavate "wet" and employ passive ex-situ dewatering methods;
- Excavate "wet" and employ active ex-situ dewatering methods;
- Excavate "dry" using in-situ dewatering methods (i.e., well points, sumps); and/or
- Excavate "dry" using cofferdams and water diversion methods (CD-30 only).

Consolidation and Engineered Cover at the Western Lagoon Area

The materials removed from the ELA and CD-30 will be transported to and consolidated into the WLS and covered with an engineered soil cover. The means and methods of consolidation and the design of the engineered cover will be determined based on the findings of the sludge/sediment characterization studies.

If the sludge/sediment characterization studies suggest a low likelihood for leaching to impact site groundwater and CD-30, the excavated materials from the ELA/CD-30 will be placed in the WLS under an engineered cover that satisfies the requirements of the ROD but does not include any additional measures.

If the sludge/sediment characterization studies indicate impacts to site groundwater and CD-30 are likely the result of consolidation or leaching, additional control or monitoring provisions will be incorporated into the Remedial Design/Remedial Action activities for the WLA. These provisions may include one or more of the following:

- Regrading of the WLA and, if necessary, importing of clean fill to ensure placement of ELA/CD-30 materials above the water table;
- Installation of a high permeability leachate collection layer and piping;
- Installation of low permeability liner or cap components; and/or
- Installation of lysimeters or interstitial monitoring devices.

When the ELA and CD-30 materials have been consolidated into the WLs, a performance monitoring program will be implemented to evaluate the results of the consolidation and the effectiveness of the engineered cover and any of the control or monitoring provisions (listed above) that may have been installed. Data from the performance monitoring will be used to determine the necessity for implementing a contingency groundwater measure.

OU1 Contingency Groundwater Measures

The OU1 contingency groundwater measures will be developed to address potential increased adverse impacts to WL groundwater quality following consolidation and prevent exacerbation of discharge impacting CD-30. The conceptual design and performance requirements of the contingency measures will be developed for the 30 Percent Remedial Design based on hydraulic assessment, sludge/sediment characterization, and baseline groundwater monitoring data collected prior to completing the 30 Percent Design.

Appropriate contingency groundwater measure options will be screened and evaluated with a preference for methods that can remove or treat the COCs in leachate and/or stabilize COCs in-situ. For example, options may include the following:

- Removal and disposal of water from a leachate collection layer;
- In-situ reactive zone (IRZ) treatment designed to stabilize metals and treat volatile organic compounds (VOCs) through the addition of carbon; or
- Construction of a permeable reactive sub-layer beneath the sludge impoundments to address metals and/or an air-sparge curtain downgradient of the impoundment to address VOCs.

Depending on the method(s) selected to protect CD-30, the contingency groundwater measure(s) may be installed during the consolidation process (i.e., leachate collection or reactive sub-layer) and then implemented, if necessary; or installed and implemented after the consolidation phase, based on the results of post-consolidation monitoring (i.e., in-situ reactive zone treatment or sparge curtain). Detailed designs for contingency measures that would be installed during consolidation would be prepared in the Remedial Design Report.

Submittals and Schedule

The PRP Group's objective is to expedite the design and implementation of the consolidation phase of the OU1 remedy while additional data are collected to evaluate the design requirements and/or necessity for the OU1 ROD groundwater remedy. The PRP Group's goal is to initiate the consolidation phase of the Remedial Action in mid-year 2004.

The proposed schedule for phased implementation of the RD/RA is presented on Table I, summarizing the major milestones and deliverables associated with completing the OU1 Pre-Design Studies and Remedial Design/Remedial Action. The design for the consolidation and contingency groundwater measures will be based on the results of the proposed hydraulic assessment, sludge/sediment characterization, and baseline groundwater sampling scopes of work. The basis for the design of the contingency groundwater measures will be developed in the 30 Percent Design Report. Further assessment of the OU1 ROD groundwater remedy will be deferred to the 30 Percent Design Report, which will identify the post-consolidation data required to develop an appropriate design and will include a schedule for the collection of the data, its evaluation, and the design of a remedy (if needed).

The PRP Group recommends meeting with the USEPA to review the proposed phased remedy approach and establish the Remedial Design/Remedial Action schedule for OU1 upon completion of the USEPA's review. A tentative date of July 15, 2003 is proposed for this meeting.

To expedite the Remedial Design process, the PRP Group is recommending eliminating the 60 Percent (Intermediate) Design Report and implementing design review meetings with the USEPA after the 30 Percent and 95 Percent (Pre-Final) Remedial Design Reports are submitted. In addition, the Remedial Action Work Plan would be completed in parallel with the Final Remedial Design Report.

Pre-Design Studies

The PRP Group will submit a revised Pre-Design Studies Report that incorporates the findings of the Phase II Pre-Design Studies investigation and addresses the elements in the Statement of Work (SOW), except for the basis for the design of the groundwater remedy, which will be deferred. The Final Draft Pre-Design Studies Report will be submitted within 30 days of receipt of the USEPA's pending comments on the deferred Response to Comments that was submitted on February 27, 2003. As described in that letter, responses to certain additional comments will be included in the Pre-Design Studies Report.

The PRP Group will complete the ongoing quarterly synoptic groundwater elevation measurements and proposed hydraulic assessment SOW to evaluate groundwater-flow patterns and the degree of communication between the upper aquifer and CD-30. These remaining elements of work will be completed concurrently with the Remedial Design Work Plan, and the results will be presented in the 30 Percent Design Report.

Remedial Design and Remedial Action

The Remedial Design for the consolidation phase and contingency groundwater measures will be developed in accordance with the ROD and SOW. Based on the proposed schedule in Table 1, the PRP Group anticipates initiating the Remedial Design Work Plan after meeting with the USEPA and establishing the Remedial Design/Remedial Action schedule.

The scope and methods of the proposed baseline groundwater sampling and sediment/sludge characterization will be developed in a letter work plan in advance of the Remedial Design Work Plan. These scopes of work will be completed prior to submitting the 30 Percent Design Report.

The 30 Percent Design Report will include the following elements in addition to the requirements of the SOW:

- Results of hydraulic assessment, groundwater monitoring, and sludge/sediment characterization,
- Evaluation of contingency groundwater measures,
- Evaluation of sediment/sludge dewatering requirements.

- Additional control or monitoring provisions, if indicated by the results of the sludge/sediment characterization,
- Development of CGWMR criteria and post-consolidation monitoring requirements, based on baseline sampling results,
- Discussion of the post-consolidation data requirements to evaluate an OUI groundwater remedy, and a schedule for its evaluation and design,
- Final Response to Comments on the draft Pre-Design Studies Report, as described in our February 27, 2003 letter.

The remaining Remedial Design/Remedial Action submittals will be developed based on USEPA review and comments on the 30 Percent Design Report.

Closing

The PRP Group believes that moving ahead with the consolidation phase while evaluating the groundwater remedy is consistent with the requirements of the ROD and facilitates continued progress on all aspects of the OUI remedy. The step-by-step approach for the initial phase outlined above provides the following:

- Technically sound and economically efficient way to begin remediating OUI;
- Reliable engineering solution that will be used to minimize or, if possible, eliminate adverse effects of consolidation on groundwater quality discharging from the WLs to CD-30;
- Reasonable basis for evaluating post-consolidation changes in groundwater quality discharging from the WLs to CD-30;
- Maintenance of water quality discharging to CD-30 from the WLs through application of contingent groundwater remedies, if needed; and
- Reduction of uncertainty in the performance requirements for the OUI groundwater remedy, resulting in a streamlined remedy selection and design process.

The PRP Group looks forward to discussing this PRA Proposal with the USEPA. As indicated above, the PRP Group recommends a meeting to discuss this proposal and establish a schedule for the Remedial Design/Remedial Action.

ARCADIS

Giang-Van Nguyen
June 23, 2003


Should you have any questions pertaining to this PRA Proposal, please feel free to contact Joe Quinnan or Mike Maierle at your convenience.

Sincerely,

ARCADIS G&M of Michigan, LLC



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Enclosure

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Table 1 - Proposed Remedial Design/Remedial Action Schedule, North Bronson Industrial Area, Operable Unit 1, Bronson, Michigan

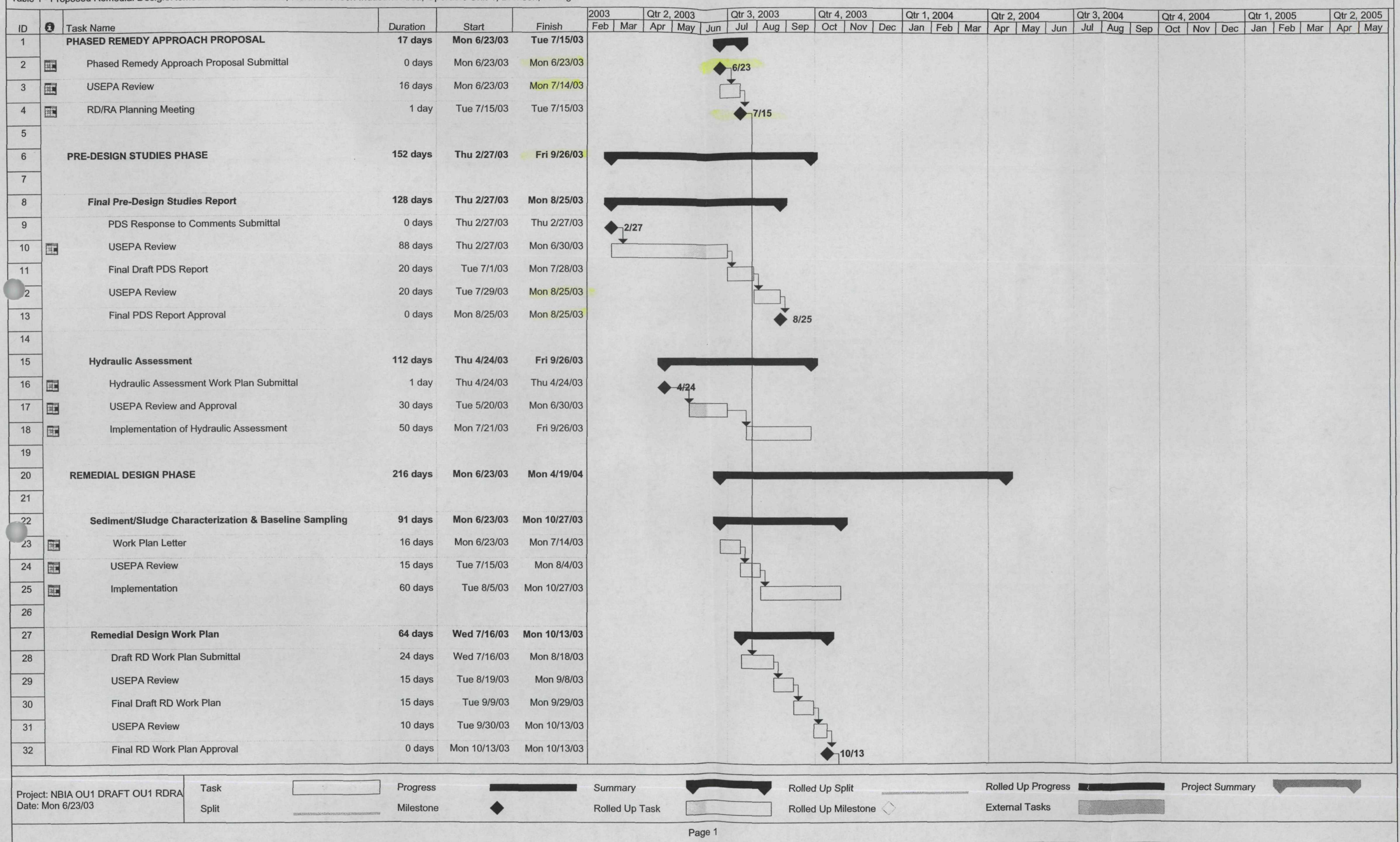
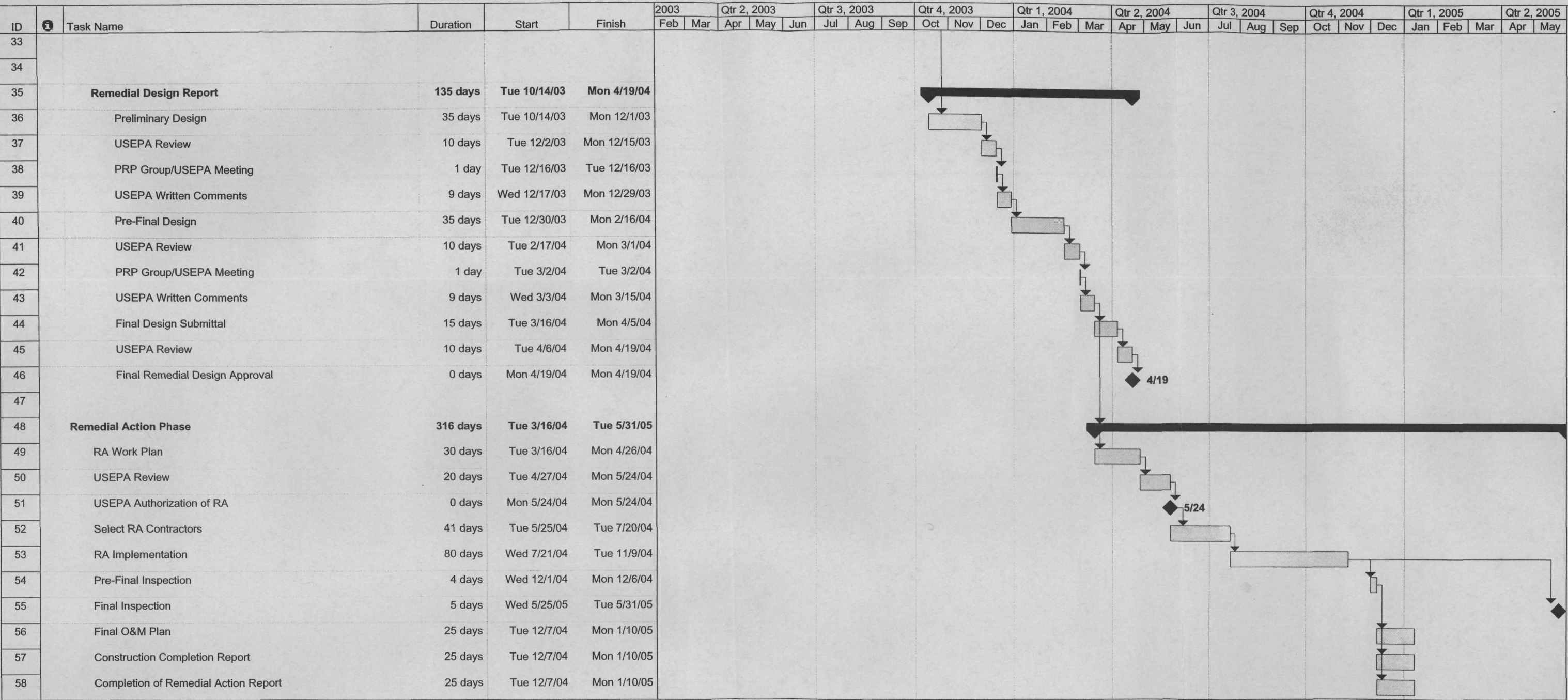
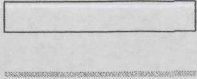


Table 1 - Proposed Remedial Design/Remedial Action Schedule, North Bronson Industrial Area, Operable Unit 1, Bronson, Michigan



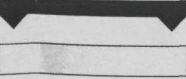
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Date: Mon 6/23/03

Task
Split



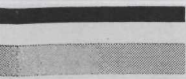
Progress
Milestone

Summary
Rolled Up Task



Rolled Up Split
Rolled Up Milestone

Rolled Up Progress
External Tasks



Project Summary

